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D. S. Nsengiyumva, P. A. Balabanov, I. S. Kiseleva

Ural Federal University,
620002, Russia, Yekaterinburg, Kuybisheva St., 48,
majoze16@gmail.com

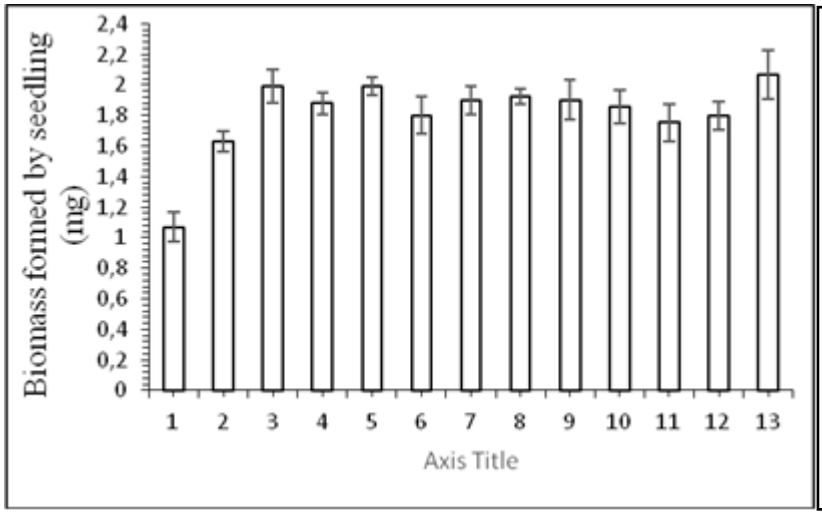
FUNGI, SOURCE OF BIOLOGICALLY ACTIVE SUBSTANCES WITH IMPORTANT APPLICATION IN AGRICULTURAL FIELDS*

Keywords: fungal crude extract, wood decomposing mushroom, biologically active compounds, seed germination, tomato.

Eleven species (dried fruit bodies) Fomitopsis pinicola, Cerrena unicolor, Piptoporus betulinus, Daedaleopsis tricolor, Stereum subtomentosum, Funalia trogii, Phellinus cinereus, Trametes versicolor, T. pubescens, T. gibbosa and Ganoderma applanatum were used to extract biologically active compounds (BACs) in crude extracts (CE). which may further be studied to evaluate their impact on rate of seeds germination, biosynthesis of photosynthetic pigments, biomass formation and of length of tomato seedlings (Solanum lycopersicum, cv. Dubrava).

Fruiting bodies of above-mentioned fungi were used in series of extractions, 500 mg of dried ground biomass and solvents consisting of 80 %, 60 %, 40 % ethanol and diH_2O. CEs were used for the quantitative measurement of free amino acids [1], total phenolic compounds [2], total soluble proteins [3]. Qualitative assay of amino acids was using ascending paper chromatography and LC-MS chromatography (UPLC-QTofXevo Waters). Seeds of tomato cultivar (Solanum lycopersicum, cv. Dubrava) were grown on Petri dishes which were moistened with CEs, the control seeds were moistened using distilled water (diH_2O). After thirteen days of growth from sowing

time, the extraction of photosynthetic pigments was carried out and content of photosynthetic pigments was spectrophotometrically determined [4]. Dried biomass of seedlings was determined, and the average biomass of seedlings was calculated (fig.).



1. DiH_2O
2. *T. versicolor a**
3. *C. unicolor*
4. *F. pinicola*
5. *T. versicolor b***
6. *P. betulinus*
7. *D. tricolor*
8. *S. subtomentosum*
9. *F. trogii*
10. *P. cinereus*
11. *T. pubescens*
12. *T. gibbosa*
13. *G. applanatum*

Figure. Seedling dried biomass (Root + shoot) (mg); [a]*and [b]**: plant substrates

The results showed that all fungal species synthesize amino acids, phenolic compounds and total proteins; CEs stimulated the rate of seeds germination; The biosynthesis of chlorophyll a, b and carotenoids was active in all seedlings, the effect (%) on biosynthesis of chl a was between +2.2 and +51.65; for biosynthesis of chl b was between –19.35 and +58.06; whereas, that of carotenoids was between –10 and +50 (Table). All CEs have showed stimulatory effect for the biosynthesis biomass of early seedling growth.

Table

Content (mg/g Fresh Weight) of photosynthetic pigments. Data presented are the mean values ± standard error (SEM) from 5 replicates.

Pigment	**Chl a**	**Effect (%)**	**Chl b**	**Effect (%)**	**Car**	**Effect (%)**
DiH_2O	0.91±0.10	0	0.31±0.05	0	0.20±0.02	0
T. versicolor [a]*	1.00±0.06	+9.89	0.42±0.03	+35.48	0.19±0.01	–5
C. unicolor	1.01±0.09	+10.99	0.41±0.02	+32.26	0.22±0.03	+10
F. pinicola	0.93±0.02	+2.2	0.30±0.01	–3.23	0.18±0.04	–10
T. versicolor [b]**	1.06±0.11	+16.48	0.38±0.04	+22.58	0.22±0.02	+10
P. betulinus	1.19±0.14	+30.77	0.38±0.06	+22.58	0.26±0.02	+30
D. tricolor	1.22±0.02	+34.07	0.37±0.02	+19.35	0.29±0.01	+45
S. subtomentosum	1.19±0.18	+30.77	0.35±0.06	+12.90	0.29±0.05	+45
F. trogii	1.38±0.13	+51.65	0.49±0.07	+58.06	0.30±0.02	+50
P. cinereus	0.93±0.11	+2.2	0.32±0.04	+3.22	0.21±0.03	+5
T. pubescens	0.99±0.13	+8.79	0.25±0.06	–19.35	0.18±0.20	–10
T. gibbosa	0.95±0.08	+4.4	0.38±0.04	+22.58	0.24±0.03	+20
G. applanatum	0.93±0.06	+2.2	0.26±0.03	–16.13	0.22±0.10	+10

[a]*and [b]**: plant substrates

Conclusion: Wood decomposing fungi can synthesize different types of biologically active substances including amino acids, proteins, phenolic compounds. CEs extracted from these fungi have showed the stimulatory effect on the germination rate of tomato seeds (*Solanum lycopersicum*, cv. Dubrava), biosynthesis of biomass and biosynthesis of chlorophylls a, b and carotenoids.

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Q. N. Okechukwu[1, 2], C. Ofoedu[2],
J. C. Ibeabuchi[2], E. G. Kovaleva[1]

[1]Ural Federal University
named after the first President of Russia B. N. Yeltsin,
620078, Russia, Yekaterinburg, Mira St., 28,
okechukwuqueency@gmail.com,
[2]Federal University of Technology,
Nigeria, Owerri

THE EFFECT OF TEMPERATURE ON THE FUNCTIONAL PROPERTIES OF *PHASELOUS LUNATUS* FLOUR AND ITS PROXIMATE COMPOSITION*

Keywords: Flour, Temperature, Proximate composition, Functional properties.

Legumes serve as the main source of plant protein and as such often used as a supplement with cereal flours in food productions. Different legumes have different functional properties that determine how they will be formed when processed to foods. Christmas Lima bean *(Phaseolus lunatus I)* is a leguminous herbaceous plant from the family *Fabaceae.* It has a buttery texture and flavour, resulting in its common name "butter bean" [1].